WHAT IS CLAIMED IS:

1. A chemical moiety comprising the reaction product of (i) a polyelectrolyte monomer and (ii) a biological agent recognition element - substituted polyelectrolyte monomer.

2. The chemical moiety of claim 1 wherein said polyelectrolyte ~~monomer~~ is a ~~monomer of~~ poly(diallyldimethylammonium chloride),

3. The chemical moiety of claim 1 wherein said biological agent recognition element is selected from the group consisting of chemical ligands, antibodies, antibody fragments, oligonucleotides, antigens, polypeptides, glycolipids, proteins, enzymes, peptide nucleic acids and polysaccharides.

4. The chemical moiety of claim 1 wherein said reaction product is of (i) a monomer of poly(diallyldimethylammonium chloride) and (ii) a biotin-substituted monomer of poly(diallyldimethylammonium chloride).

5. A polymer system comprising:

an ionic conjugated polymer; and,

an electronically inert polyelectrolyte having a biological agent recognition element bound thereto.

6. The polymer system of claim 5 wherein said ionic conjugated polymer is selected from the group consisting of soluble derivatives of poly(phenylene vinylene), polythiophene, poly(pyridyl vinylene), polyphenylene, polydiacetylene, and polyacetylene.

7. The polymer system of claim 5 wherein said polyelectrolyte is selected from the group consisting of poly(diallyldimethylammonium chloride), ???

8. The polymer system of claim 5 wherein said biological agent recognition element is selected from the group consisting of chemical ligands, antibodies, antibody fragments, oligonucleotides, antigens, polypeptides, glycolipids, proteins, enzymes, peptide nucleic acids and polysaccharides.

9. A method of detecting a biological agent in a sample comprising:

contacting a sample with a sensor including a polymer system capable of having an alterable measurable property selected from the group consisting of luminescence, anisotropy, redox potential and uv/vis absorption, said polymer system including an ionic conjugated polymer and an electronically inert polyelectrolyte having a biological agent recognition element bound thereto, said electronically inert polyelectrolyte adapted for undergoing a conformational structural change upon exposure to a biological agent having affinity for binding to said recognition element bound to said electronically inert polyelectrolyte whereby a detectable change in said alterable measurable property can occur; and,

permitting said recognition element to bind with said biological agent present in said sample; and,

determining any detectable change in said alterable measurable property of said polymer after said permitting step, wherein a difference in said alterable measurable property after said permitting step compared with said alterable measurable property in the absence of said sample is indicative of the presence of said biological agent.

10. The method of claim 9 wherein said method is optical detection of luminescence change by the polymer system.

11. The method of claim 9 wherein said ionic conjugated polymer is selected from the group consisting of soluble derivatives of poly(phenylene vinylene), polythiophene, poly(pyridyl vinylene), polyphenylene, polydiacetylene, and polyacetylene.

12. The method of claim 9 wherein said ionic conjugated polymer is selected from the group consisting of soluble derivatives of poly(phenylene vinylene), polythiophene, poly(pyridyl vinylene), polyphenylene, polydiacetylene, and polyacetylene.

13. The method of claim 9 wherein said recognition element is selected from the group consisting of chemical ligands, antibodies, antibody fragments, oligonucleotides, antigens, polypeptides, glycolipids, proteins, enzymes, peptide nucleic acids and polysaccharides.

14. The sensor of claim 9 wherein the biological agent is selected from the group consisting of proteins, viruses, bacterial, cells, microorganisms, antibodies, antibody fragments, nucleic acids and toxins.

15. A sensor comprising:

a polymer system capable of having an alterable measurable property selected from the group consisting of luminescence, anisotropy, redox potential and uv/vis absorption, said polymer system including an ionic conjugated polymer and an electronically inert polyelectrolyte having a biological agent recognition element bound thereto, said electronically inert polyelectrolyte adapted for undergoing a conformational structural change upon exposure to a biological agent having affinity for binding to said recognition element bound to said electronically inert polyelectrolyte; and,

a means of detecting said detectable change in said alterable measurable property.

16. The sensor of claim 15 wherein said polymer system is adfixed on a support or dissolved in solution.

17. The sensor of claim 15 wherein said alterable measurable property is luminescence and said ionic conjugated polymer is a fluorescent polymer.

18. The sensor of claim 15 wherein said recognition element is selected from the group consisting of chemical ligands, antibodies, antibody fragments, oligonucleotides, antigens, polypeptides, glycolipids, proteins, enzymes, peptide nucleic acids and polysaccharides.

19. The sensor of claim 15 wherein the biological agent is selected from the group consisting of proteins, viruses, bacterial, cells, microorganisms, antibodies, antibody fragments, nucleic acids and toxins.

20. The sensor of claim 15 wherein said ionic conjugated polymer is selected from the group consisting of soluble derivatives of poly(phenylene vinylene), polythiophene, poly(pyridyl vinylene), polyphenylene, polydiacetylene, and polyacetylene.

21. A kit for the detection of biological agents comprising:

a fluorescent polymer; and,

a chemical moiety of claim 1.

22. A process of tuning fluorescent properties of an ionic conjugated polymer comprising:

admixing an ionic conjugated polymer with an electronically inert polyelectrolyte comprising the reaction product of: (i) a polyelectrolyte monomer; and, (ii) a biological agent recognition element -substituted polyelectrolyte monomer thereby increasing the quantum efficiency of the ionic conjugated polymer.

23. The process of claim 22 wherein said ionic conjugated polymer is a fluorescent polymer.